Please check the examination details below before entering your candidate information

Candidate surname	Other names

Pearson Edexcel
Level 1/Level 2 GCSE (9–1)

Centre Number | Candidate Number

Sample assessment material for first teaching
September 2020

Time: 1 hour 30 minutes | Paper Reference **1CP2/01**

Computer Science

Paper 1: Principles of Computer Science

You do not need any other materials.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- You are not allowed to use a calculator.

Information

- The total mark for this paper is 75.
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

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S 6 7 2 8 5 A 0 1 1 6

Pearson

Answer ALL questions. Write your answers in the spaces provided.

Some questions must be answered with a cross in a box ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

1 Data

(a) Identify the smallest unit of measurement.

(1)

☒ **A** bit

☒ **B** byte

☒ **C** kibibyte

☒ **D** nibble

(b) Identify the maximum number of values that can be represented with 5 bits.

(1)

☒ **A** 5

☒ **B** 16

☒ **C** 25

☒ **D** 32

(c) A car park uses a number-plate recognition system.

(i) Identify the reason why an unsigned integer should be used to record the number of cars entering the car park, rather than a signed integer.

(1)

☒ **A** Unsigned integers are more accurate

☒ **B** Unsigned integers cannot have overflow errors

☒ **C** Unsigned integers store more positive values

☒ **D** Unsigned integers do not use a parity bit

(ii) The system stores images of car number plates.

Construct an expression to show how many bytes there are in 6 tebibytes.

You do not need to carry out the calculation.

(3)

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(d) Identify the 4-bit binary addition that will result in an overflow error.

(1)

- ☒ **A** 1001+1000
- ☒ **B** 0011+1001
- ☒ **C** 1000+0110
- ☒ **D** 0111+1000

(e) Give the 8-bit binary representation of the denary number 82.

(2)

(f) (i) Convert the binary number 0011 1101 to hexadecimal.

(2)

(ii) Explain why hexadecimal notation is used.

(2)

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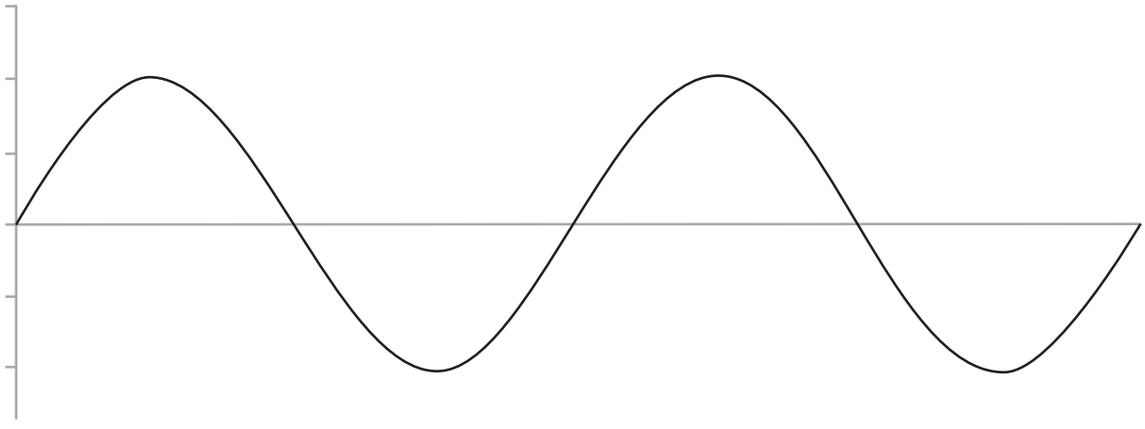
(g) An analogue to digital converter is used to change the sounds received by a microphone into a form that can be processed by a computer.

Complete the diagram to show a sample interval and label both axes.

(3)



(h) An image uses a 12-bit colour depth. It is 64 pixels wide and 48 pixels high.

Construct an expression to calculate the file size of the image in MiB.

You do not have to do the calculation.

(4)

(Total for Question 1 = 20 marks)

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2 Networks

(a) A hotel chain has hotels in several countries and a head office in England.

State the type of network needed to connect these hotels to the head office.

(1)

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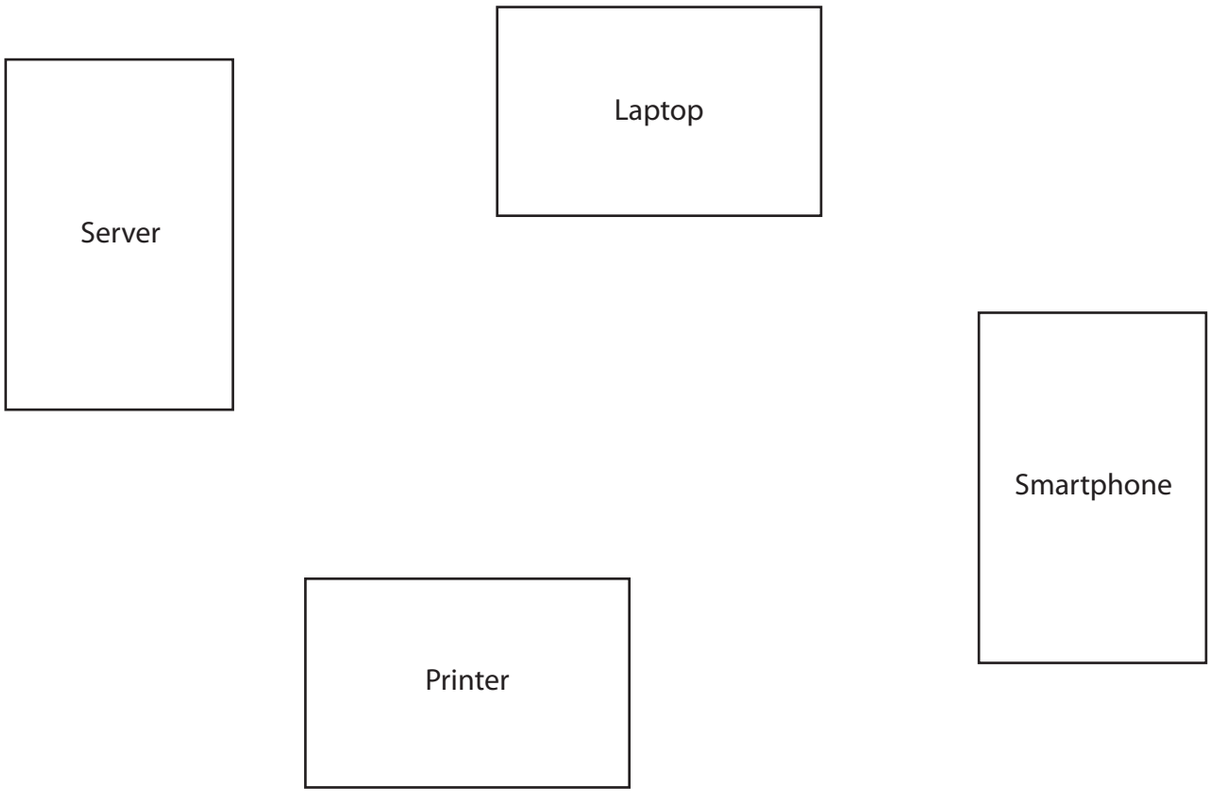
(b) Draw lines between these devices to show a fully-connected mesh network topology diagram:

(2)



(c) Routers send packets that contain data around the internet.

State **two other** items found in a packet.

(2)

1 .....

.....

2 .....

.....

(d) The transport layer of network protocols splits data into packets before sending it. All the packets are received correctly.

Describe the process that ensures the data received matches the original.

(2)

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(e) Construct an expression to show how many seconds it will take to transmit 20 MiB of data using a network transmission speed of 2 Mbps.

You do not have to do the calculation.

(4)

(Total for Question 2 = 11 marks)

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3 Issues and impact

(a) State **two** environmental issues associated with the disposal of digital technology.

(2)

1 .....

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2 .....

.....

(b) This notification appears on a computer screen.

Thank you for clicking our link.
Your important files are no longer accessible.

Can I get access to my files?
Yes, you can. Simply send your payment as described below.

How long do I have?
14 days.

How do I pay?
Send £500 in Bitcoin to abc123def456ghi789.

(i) Name the type of malware used in this cyberattack.

(1)

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(ii) Explain **one** way that digital systems may be vulnerable to cyberattacks when users do not properly maintain their software.

(2)

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(c) People use spoken commands to interact with digital assistants.

Explain **one** ethical concern associated with digital assistant technologies.

(2)

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(d) Students are asked to sign an acceptable use policy.

Explain **one** way that an acceptable use policy helps to protect student data.

(2)

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(Total for Question 3 = 9 marks)

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4 Computers

(a) One function of utility software is to provide anti-malware.

State **two other** functions of utility software.

(2)

1 .....

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2 .....

.....

(b) State **one** way that a code review helps programmers to produce robust software.

(1)

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(c) Describe the role of the control unit, the control bus, the data bus and the address bus when fetching an instruction from memory.

(4)

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(d) The operating system controls the scheduling of processes.

Describe how the operating system uses scheduling to allocate processor time.

(4)

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(e) A team of programmers is creating the code for an alarm system. The system uses a high-level programming language for the touchscreen graphical user interface and a low-level language for the control unit that monitors the sensors and triggers the alarm.

Discuss the characteristics of high-level languages and low-level languages that make them appropriate for the team of programmers to code these uses.

Your answer should consider:

- the purpose of the system
- the advantages of high-level languages
- the advantages of low-level languages.

(6)

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(Total for Question 4 = 17 marks)

5 Computational thinking

(a) State the type of error that can be found in **algorithms**.

(1)

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(b) A binary search algorithm is used with this list to find the target value 'b'.

a b c d e f g h i j k

Complete the table to show the **three** characters in the order that the algorithm would compare them against the target value.

(3)

First	
Second	
Third	
Fourth	b

(c) Programmers can use all capitals to show that a value is a constant.

A constant is shown here on line 3.

```
2 # Prototype for the main swimming pool
3 MAX_CAPACITY = 120      # Maximum number of swimmers
4
5 numAdult = 14           # Current number of adults swimming
6 numChild = 73           # Current number of children swimming
```

Explain **one** reason why programmers use signals indicating a value is a constant, rather than repeating the same fixed value throughout an algorithm.

(2)

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(d) Margaret owns an ice-cream shop.

This program manipulates sales figures from Margaret's shop.

```
num = 0
x = 999
y = 0
line = ""

f = open("SalesFile.txt", "r")
for line in f:
    num = int(line)
    if num < x:
        x = num
    if num > y:
        y = num
print(x, y)
f.close()
```

The only inputs from the file to the program are 355, 554, 199 and 409.

Complete the trace table showing the execution of the program with these four inputs.

You may not need to fill in all the rows in the table.

(6)

num	x	y	Display

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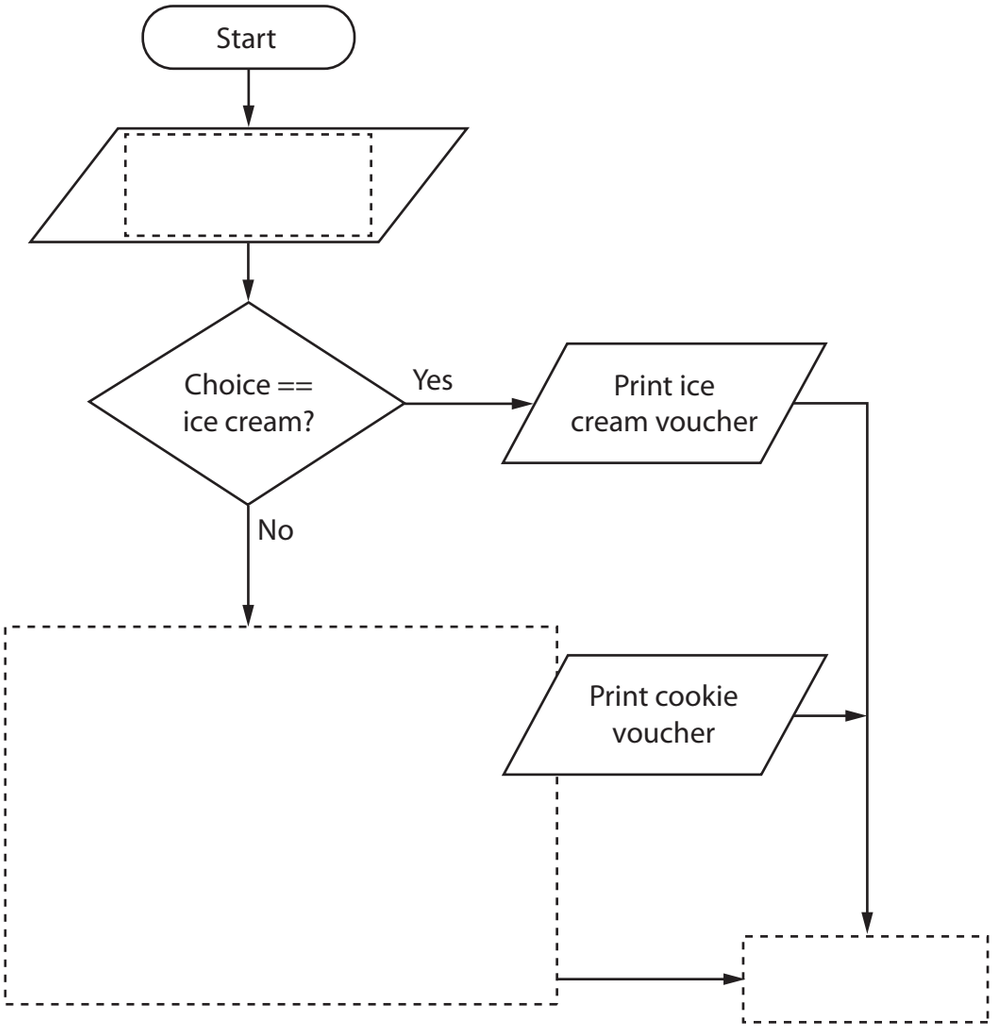
(e) Customers can get a voucher for their favourite item.

- Customers whose favourite item is ice cream get a voucher for ice cream.
- Customers whose favourite item is cookies get a voucher for cookies.
- Customers who do not choose either get a voucher for drinks.

Complete the flowchart to show this process.

(6)



(Total for Question 5 = 18 marks)

TOTAL FOR PAPER = 75 MARKS

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